Rare Plant Surveys & Stewardship
in the Rural Municipality of Stuartburn

Including new and updated occurrences resulting from surveys conducted in 2003 by the Manitoba Conservation Data Centre

Manitoba Conservation Data Centre MS 04-01

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Executive Summary

The Rural Municipality of Stuartburn encompasses an unique landscape characterized by an amazing variety of natural communities: from rich songbird-laden aspen woodland, to vast sedge meadows, lazily meandering streams, dry sandhill oak savannah, and some of Manitoba's last remaining tallgrass prairie meadows. The unique communities found here support a diverse suite of species, many of which are provincially or nationally rare. Habitat loss and other threats have resulted in some species, including six plants, being protected under Canada's *Species at Risk Act* and/or Manitoba's *Endangered Species Act*.

The Manitoba's Conservation Data Centre (CDC) collects and maintains information on the range, extent, population dynamics, and threats to rare species throughout Manitoba. In 2003, a number of factors led CDC staff to place particular emphasis on rare plant surveys and stewardship in the RM of Stuartburn: 1) the area represents a significant concentration of Manitoba's rare plant species, 2) the opportunity to apply improved survey and data storage protocols to a large concentration of occurrences, 3) the opportunity to partner with Tall Grass Prairie Preserve staff to harmonize rare plant occurrence data, 4) opportunities to raise awareness of Stuartburn's rare species and habitat stewardship opportunities, 5) opportunities to cooperate with partners in developing a strategic plan to conserve key ecosystem-level targets and the rare species they support.

All RM of Stuartburn rare plant occurrence data recorded in the CDC's rare species database was examined and harmonized with upgraded data storage protocols. Field work focussed on updating the spatial extent of known species occurrences, especially those where GPS technology had not been utilized as part of previous surveys. The spatial extent of all rare plant occurrences on the Tall Grass Prairie Preserve and adjacent road allowances was digitized in the CDC's rare species database, and non-spatial data harmonized. As a result of improved mapping and an altered element occurrence definition, the number of rare plant occurrences in the RM decreased from 117 to 100 units. These 100 occurrences were comprised of 442 source features (distinct patches or subpopulations). In 2003, CDC staff were also involved in partnerships to develop landscape-scale conservation strategies and in other communication and survey initiatives.

Acknowledgments

This work was made possible thanks to the financial support of the Special Conservation Fund and the Wildlife and Ecosystem Protection Branch of Manitoba Conservation, as well as the Habitat Stewardship Program of Environment Canada. The Manitoba Museum, the Critical Wildlife Habitat Program, and the Manitoba Habitat Heritage Corporation all provided invaluable logistical support.

Many individuals provided valuable advice and assistance, including Kevin Johnson of the Gardenton PFRA Community Pasture, John Tkachuk of the Tall Grass Prairie Preserve, Sandi Faber and Charles Fregeau of the Manitoba CDC, and Jason Greenall and Peggy Westhorpe of Manitoba Conservation's Wildlife and Ecosystem Protection Branch. The expertise and enthusiasm of Tall Grass Prairie Preserve staff members Laura Reeves and Christie Borkowsky, in particular, is greatly appreciated. Their tireless efforts in the Stuartburn area have resulted in a local botanical knowledge base that is unmatched elsewhere in the province.

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Introduction and Methods

Natural areas within the Rural Municipality (RM) of Stuartburn are characterised by a mosaic of aspen woodland, wetlands, and prairie, including Manitoba's best remaining examples of tallgrass prairie. Despite occupying less than 0.2% of Manitoba's land base, 7% of the rare plant occurrences tracked by the Manitoba Conservation Data Centre are found within it's boundaries (Manitoba CDC data, November 2003). Four Stuartburn species are listed as Endangered, Threatened or Special Concern under Canada's *Species*

at Risk Act (Small white lady's-slipper (*Cypripedium candidum*), Western prairie fringed orchid (*Platanthera praeclara*), Western silvery aster (*Symphyotrichum sericeum*) and Riddell's goldenrod (*Solidago riddellii*)) and six are listed under Manitoba's *Endangered Species Act* (Western prairie fringed orchid, Small white lady's-slipper, Riddell's goldenrod, Western silvery aster, Culver's root (*Veronicastrum virginicum*), and Great Plains ladies-tresses (*Spiranthes magnicamporum*).

The principal function of Manitoba's Conservation Data Centre (CDC) is to assemble and provide information for the conservation of Manitoba's natural biodiversity. Information on the range, extent, population dynamics, and threats to rare species is collected and maintained using standardized, science-based methods. The information maintained by the CDC is used to assess the status of Manitoba's species, as well as for conservation planning, natural resource management, and environmental impact assessments. The CDC recently upgraded its rare species tracking software to a more powerful and versatile database and geographic information application. Whereas the previous system represented rare species populations as points in space, the upgraded system allows for polygon-based mapping that can take into account differing areas of density, exclude inappropriate habitat, and allow local range contractions and expansions to be monitored. The definition of an element occurrence (EO) was improved, as well. An EO is an area of land and/or water in which a species or natural community is, or was present. An EO should have practical conservation value for the species and represent a location important to the conservation of the species or community. Once current data is upgraded to reflect these new capacities, the ability to monitor the status of Manitoba's rare species populations and to provide accurate location information will be vastly improved.

One of the Manitoba CDC's primary goals in 2003 was to upgrade the quality of rare plant data in the RM of Stuartburn through direct surveys and other data collection methods. Secondary goals included communicating the importance of this area to target audiences and cooperating with partners to develop a landscape-scale biodiversity conservation plan.

Nomenclature of all plant species follows Kartesz (1999). The global, national, and subnational conservation ranks used throughout this report (e.g. G5, N1, S1) are defined in the Appendix. Images are © Cary Hamel/Manitoba Conservation Data Centre.

Cooperation with Tall Grass Prairie Preserve staff to harmonize and digitize rare plant occurrence records

The Manitoba Tall Grass Prairie Preserve (TGPP), located on the western edge of the RM of Stuartburn, protects a high concentration of provincially and nationally rare plant species. As of September 2003, the CDC's rare species tracking system recorded 52 occurrences of 17 rare plant species within the boundaries of the TGPP.

Using aerial photographs, markers, and acetate sheets, TGPP staff annually record the on-Preserve range and density of many of the CDC's high-priority species. The locations of a number of other provincially rare species, while not formally noted, are known by

Preserve staff with sub-quarter section accuracy. By contrast, the corresponding species occurrence information present in the CDC's database was represented only as points or a series of points, with a point usually signifying that the species was known from within the quarter section.

In the winter of 2003/2004, TGPP staff (Laura Reeves and Christie Borkowsky), working in cooperation with CDC staff knowledgeable of natural heritage network data entry and documentation procedures, reviewed Preserve records of all high-priority plant species known from the Preserve and compared these to the information present in the CDC's rare species tracking system. Where discrepancies existed, range and density information was digitized and non-spatial information updated. An estimate of representational accuracy (the degree to which EO boundaries correspond to on-the-ground species coverage) and a buffer encompassing locational uncertainty was assigned to each EO. The revised EO definition was expected to result in a decline in the number of EOs present at the Preserve.

Refinement of off-Preserve rare plant occurrences within the RM of Stuartburn

A pre-inventory list of known occurrences of all rare or uncommon (species ranked S1, S1S2, S2, S2S3, S3) plant species in the RM of Stuartburn was produced from the CDC's Biotics rare element tracking database. This list was sorted based on precision of known location and date of last survey.

Field surveys in 2003 focussed on non-Preserve species occurrences that were last surveyed pre-2001 (in general, GPS units have been used by researchers since then) and Preserve species occurrences that had been under-recorded in annual TGPP surveys. The goal of these surveys was to relocate occurrences and collect precise boundary information and updated habitat, population, and threat information. In a number of cases, EO records were based on herbarium records collected in the early part of the 20th century. The directions provided on these herbarium labels are often vague. A 1950's Canada Ginger collection, for example, was recorded as being from 'Sundown, Manitoba', likely indicating its collection in the general vicinity of the town of Sundown. Under the revised natural heritage methodology, vague records such as these are mapped as large target areas, in this case centred around the village of Sundown. Surveys in 2003 involved the identification and search of suitable habitat within the boundaries of this and similar 'vague' EOs. EOs with relatively good locational certainty but for which GPS coordinates were not available were also surveyed. Surveys were closely coordinated with TGPP staff, who were often knowledgeable of off-Preserve occurrence locations and status.

All information was recorded on standard data sheets in the field, photographs taken, and patch boundaries recorded with a GPS. Species phenology and the geographic location of targeted survey sites were considered when scheduling field activities. Surveys were conducted between June 5 and September 8, and included:

1) Detecting occurrences in suitable habitat proximate to known locations, and in other areas believed to provide suitable habitat. Surveys focussed on crown lands,

Nature Conservancy of Canada (NCC) and TGPP lands, the Prairie Farm Rehabilitation Administration's Gardenton Community Pasture and road allowances.

2) Recording inventory information on standard forms (see Appendix). Information collected included areal extent, habitat, and landscape characteristics, threats to populations, GPS coordinates, and digital or slide images.

Information was transcribed into the Biotics Mapping application and the Tracker non-spatial information database.

Roseau River BioBlitz

CDC staff, in collaboration with the Nature Conservancy of Canada, organized a BioBlitz for May 14, 2003. The Roseau River runs from the United States border northeast through the RM of Stuartburn, and is under considerable stress due to altered hydrology, invasive species, nutrient loading and habitat destruction (Hamel et al., *in prep*). There is a lack of basic data regarding the current biological makeup of this portion of the river and its associated riparian areas. A BioBlitz involves a number of volunteers and scientists working together for one day to rapidly compile of a list of the species present in an area, along with notes as to abundance, invasiveness, and habitat disturbance. Members of the university community, government, museums, environmental organisations and non-profit organizations were contacted about potential participation; a copy of the announcement can be found in the Appendix.

Communication

Many species-at-risk occurrences in the RM of Stuartburn lie adjacent to or within road allowances. As such, they have the potential to be damaged through road allowance maintenance activities (e.g. mowing, ditch maintenance, drain expansion). These activities are normally the responsibility of the local RM government. Communication of the presence and importance of rare species within the RM of Stuartburn in general, and in road allowances specifically, was actively sought. The RM council was approached, and a presentation was made in a regular council meeting on December 2, 2003. In addition, CDC staff were invited to make a presentation at 'Tall Grass Prairie Day' in Gardenton on August 9, 2003.

Partnership to develop a conservation area plan

In 2003/2004, the CDC cooperated with Nature Conservancy Canada, The Nature Conservancy, Manitoba Conservation and other partners to develop the first iteration of a conservation area plan that will provide an holistic, science and experience-based blueprint for conservation action in an area known as the Tallgrass Aspen Parklands. The RM of Stuartburn comprises an important component of the core of this landscape. The plan will summarize conservation elements of concern, identify threats to these elements, present threat abatement strategies, and establish a plan to monitor success in implementing conservation action. Conservation of ecosystem-level targets will, in turn, result in the maintenance or recovery of the species supported within, including rare plants.

Results

Tall Grass Prairie Preserve data harmonization

All rare plant occurrences on the Preserve and in adjacent road allowances were examined, compared to existing data in the CDC database, and the database updated as required. The CDC's new element occurrence definition was expected to result in a reduction in the total number of Preserve occurrences (e.g. Figure 1). Western prairie fringed orchid occurrences, for example, were reduced from 28 to 2, a number that more closely reflects the actual rarity of the species. Overall, however, the number of Preserve occurrences in the CDC's database rose from 52 to 60. These 60 rare plant occurrences were comprised of over 200 discreet source features (distinct patches or subpopulations). Nineteen rare plant species found on the Preserve are now represented in the CDC's database, including 5 species (26 occurrences) listed under Canada's *Species at Risk Act* and/or Manitoba's *Endangered Species Act*. Due to the variety of recording practices used by Preserve staff, the locational uncertainty of the plant patches that comprise an EO necessarily varied. When digitized based on the Preserve's infra-red photograph set, an uncertainty buffer of 25-50 m was typically used. An example of the spatial structure now stored in the CDC's database is presented in Figure 2.

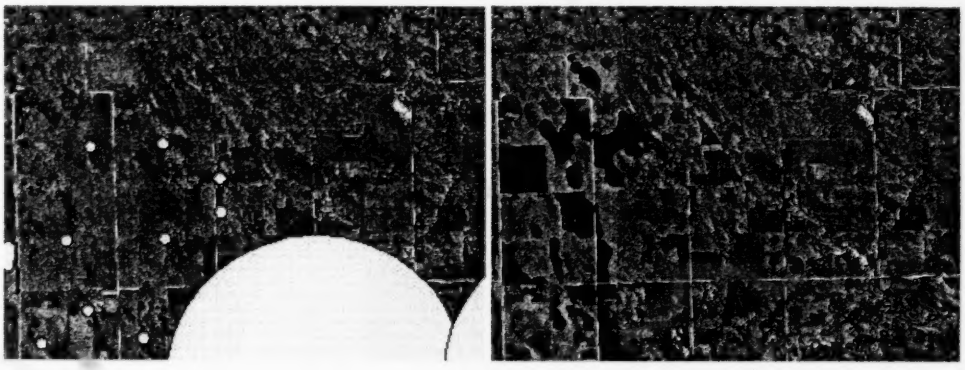

Figure 1. Example of the spatial data stored in the CDC's rare species database before (left image) and after (right image) data harmonization with Tall Grass Prairie Preserve staff. At least 12 occurrences can be seen in the leftmost image (filtered to show only one species), whereas all patches delimited on the right are considered part of one element occurrence.

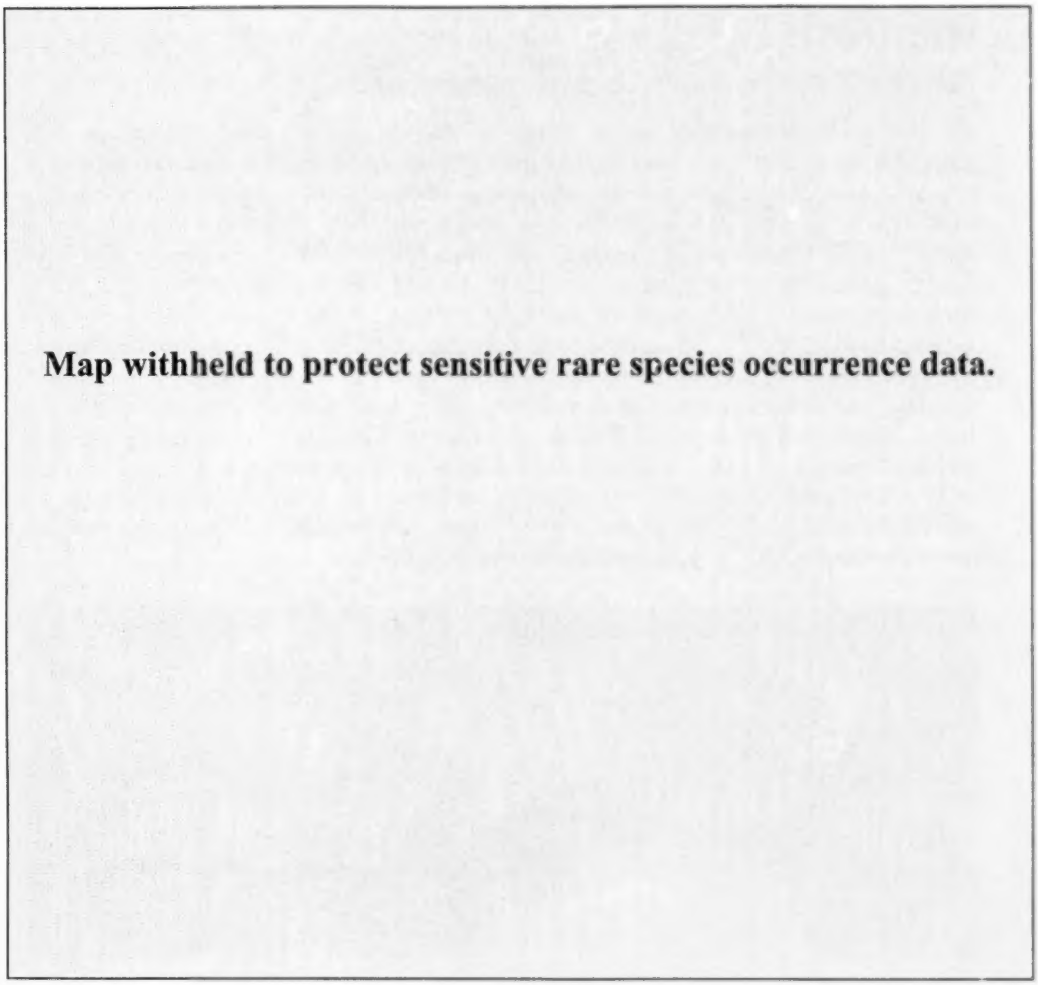

Figure 2. Occurrences of plants considered Threatened or Endangered under Manitoba's *Endangered Species Act* or Canada's *Species at Risk Act* within the Tall Grass Prairie Preserve Management Area.

Off-Preserve occurrence refinement

A careful review of all rare plant element occurrences (n=117) within the RM of Stuartburn was undertaken, and the revised heritage methodology applied where possible. Where the information in the CDC database did not allow revision, field surveys were made. At least 50 off-Preserve locations within the RM of Stuartburn were surveyed and information was collected on species areal extent, habitat, landscape characteristics, and threats to populations. For the RM as a whole (including the results of data harmonization with the TGPP), the number of rare plant occurrences declined from 117 to 100. These 100 occurrences were comprised of 442 discreet source features of 23 rare plant species (Table 1). Relocation of existing records was occasionally quite difficult, especially for records with vague directions. In some cases, despite searches of apparently suitable habitat, species patches could not be relocated. In this case EO boundaries were normally left unchanged, but a representational accuracy value of 'low' was assigned.

Table 1. Rare plant species occurring within the RM of Stuartburn.

Scientific Name	Common Name	Global Conservation Rank	Provincial Conservation Rank	Canada's *Species at Risk Act*	Manitoba's *Endangered Species Act*	# EOs in the RM of Stuartburn
Agalinis tenuifolia	Slender False-foxglove	G5	S2S3			8
Asarum canadense	Canada Wild-ginger	G5	S3?			2
Asclepias verticillata	Whorled Milkweed	G5	S2			2
Astragalus neglectus	Cooper's Milkvetch	G4	S1			1
Carex conoidea	Field Sedge	G5	S1			1
Carex tetanica	Rigid Sedge	G4G5	S2			3
Cypripedium candidum	Small White Lady's-slipper	G4	S1	Endangered	Endangered	7
Desmodium canadense	Showy Tick-trefoil	G5	S2S3			2
Epigaea repens	Trailing Arbutus	G5	S3?			1
Geranium maculatum	Wild Crane's-bill	G5	S?			2
Hypoxis hirsuta	Eastern Yellow Stargrass	G5	S3			6
Krigia biflora	Two-flowered Dwarf Dandelion	G5	S2			7
Liparis loeselii	Loesel's Twayblade	G5	S3?			5
Lysimachia quadriflora	Four-flowered Loosestrife	G5?	S2			10
Oenothera perennis	Small Sundrops	G5	S1S2			3
Ophioglossum pusillum	Adder's Tongue	G5	S1			2
Platanthera praeclara	Western Prairie White-fringed Orchid	G2	S1	Endangered	Endangered	2
Polygala verticillata	Whorled Milkwort	G5	S2			1
Sisyrinchium campestre	Prairie Blue-eyed Grass	G5	SU			1
Solidago riddellii	Riddell Goldenrod	G5	S2	Special Concern	Threatened	13
Spiranthes magnicamporum	Great Plains Ladies'-tresses	G4	S1?		Endangered	14
Symphyotrichum sericeum	Western Silvery Aster	G5	S2	Threatened	Threatened	4
Veronicastrum virginicum	Culver's-root	G4	S1		Threatened	3

Roseau River BioBlitz

Turnout for the event was good; 15 volunteer biologists representing the CDC, the Fisheries and Parks and Natural Areas Branches of Manitoba Conservation, the University of Manitoba, the Manitoba Museum, the Centre for Indigenous Environmental Resources and the Department of Fisheries and Oceans worked together to compile much-needed vegetation, fish, and mollusc data for both natural and degraded areas of the Roseau River and it's associated riparian areas. Locations surveyed are indicated in Figure 3. No rare species were encountered during the event.

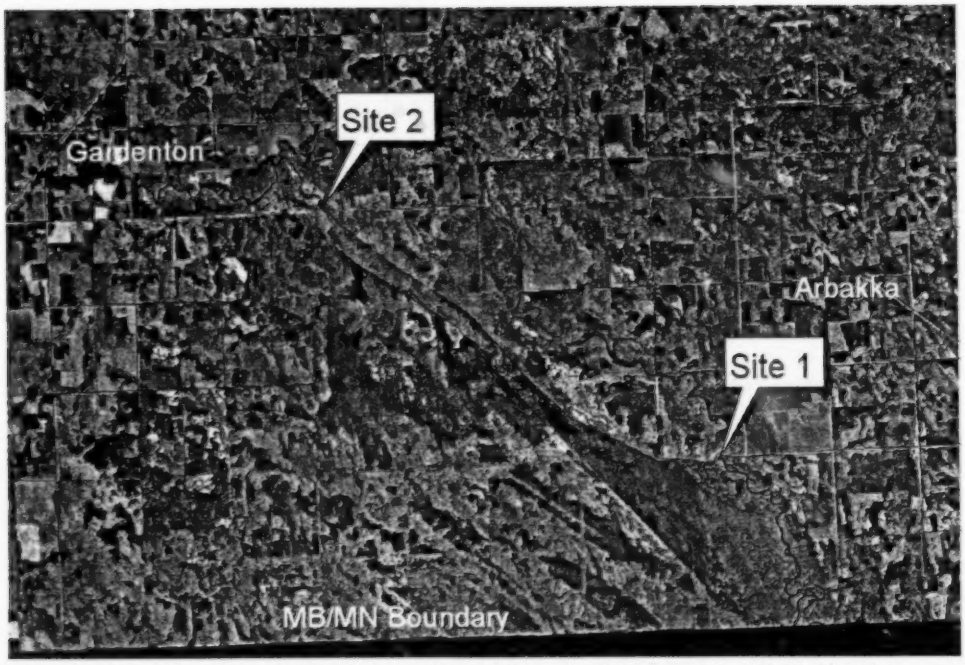

Figure 3. Sites surveyed as part of the Roseau River BioBlitz. Site 2 represented a disturbed location (channelization).

Communication

A presentation entitled 'Biodiversity in the RM of Stuartburn' was given to the RM of Stuartburn Council on December 2, 2003. It was hoped that this would represent an initial step in communication with the RM, with the eventual goal of partnering with road allowance maintenance staff to identify, in the field, rare species occurrences in road allowances and to jointly develop mitigation rec· ımendations. The emergence of a proposal to build an intensive livestock operation in the vicinity of the TGPP has, however, resulted in local and regional controversy (reflected in letters to the Steinbach Carillon and through conversations with local residents) and the invocation of species-at-risk as a point of debate. As such, CDC staff decided to delay the engagement of RM staff in further discussion of rare species stewardship until a less controversial atmosphere develops.

A presentation given at 'Tall Grass Prairie Day' on August 9, 2003 was well received. Species at risk and other rare species of the RM of Stuartburn were discussed within the context of landscape-scale conservation area planning.

Conservation area planning

CDC staff contributed data and expertise to aid in conservation area planning at the Tallgrass Aspen Parklands (Figure 4). The final plan, slated for completion in early 2004, will identify landscape-scale conservation targets, the major threats to these targets, the strategies required to recover them or abate threats, and a monitoring plan to measure successes in recovery and threat abatement.

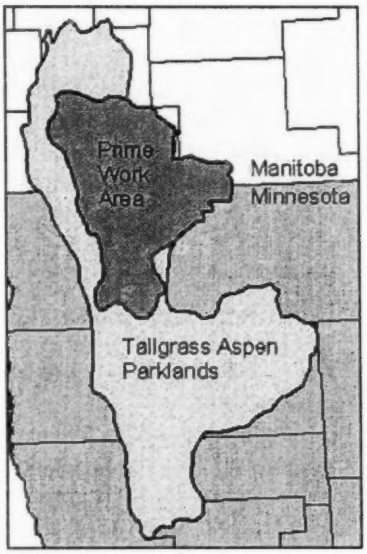

Figure 4. The Tallgrass Aspen Parklands landscape.

One of the conservation targets identified within the plan is the 'upland mosaic' ecosystem. Characterised by a complex and changing relationship between open tall grass meadows, savannah and closed aspen forest, this habitat supports a number of species of conservation concern, including all of the RM of Stuartburn's nationally and provincially endangered plant species. Recurrent wildfire is the key ecological factor sustaining this system, and a lack of appropriate landscape-scale fire management is its greatest threat. Other moderate and high threats to the landscape's ecosystems include hydrological modifications, gravel extraction, conversion to agriculture, and incompatible grazing practices. More information on conservation targets, threats, and strategies for recovery or stress abatement will be available upon completion of the planning process.

Using Dominion Land Surveyor's Notes to Guide Stewardship

Prescribed fire is often used as a rare species stewardship tool in the RM of Stuartburn. Staff of the Tall Grass Prairie Preserve, for example annually burn portions of the Preserve in order to control the woody encroachment that would eventually degrade open prairie areas and result in the loss of the shade-intolerant species they support. Information regarding the historical frequency, timing and size of fires in the area would help to guide current efforts, but is largely unavailable.

To help answer some of these questions, CDC staff worked with Charles Fregeau, a student working with the Manitoba/Quebec Exchange Program, to transcribe historical vegetation and disturbance notes for the RM of Stuartburn from Dominion Land Survey records. This information will allow an objective comparison to be made between pre-settlement landscape conditions (the records go back as far as 1875) and current land use and vegetation cover. In combination with other measures, this data will guide species recovery strategies (e.g. prescribed burning) towards a measurable, ecologically-based vegetation mosaic and composition.

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Stewardship Recommendations

- Increase local awareness of the presence of rare plant species within the RM of Stuartburn. While the Tall Grass Prairie Preserve is generally recognized as being important rare species habitat, the presence of these species on other high-quality lands and road allowances may not be as well known. Species at risk fact sheets, pamphlets, and other print media may help raise awareness. Opportunities for formal and informal communications with private landowners, land managers, and RM staff and council should be utilized whenever possible. In all cases, the importance of sound stewardship by landowners should be acknowledged and/or stressed.
- Establish an RM of Stuartburn right-of-way (ROW) management plan. A number of species at risk occurrences occur in remnant native habitat in road allowances and are threatened by maintenance activities such as haying, spraying of herbicides, drainage improvement, and trenching or digging activities conducted by municipalities or utility companies. In most cases, ROW maintenance staff are not aware of the presence of these occurrences. A contact protocol and management plan, produced in cooperation with Manitoba Highways and Transportation and rural municipalities, is required in order to ensure the continued existence of many species at risk occurrences. The development of mitigation recommendations and a method of rapid field identification are essential.
- Implement the conservation strategies recommended by the jointly-produced Tallgrass Aspen Parklands Conservation Area Plan. The application of these strategies will serve to abate the current threats to Stuartburn's ecosystems and improve degraded key ecological factors.

Next Steps

- On-the-ground surveys and data harmonization in 2003 focussed on rare plant species. A similar project should be undertaken for rare animal species and plant communities.
- Where suitable private lands occur adjacent to road allowance rare plant populations, land owners should be contacted and asked for permission to survey their lands. A list of the best quality private lands should be forwarded to the Nature Conservancy of Canada to guide potential conservation agreement negotiations.
- CDC staff should continue to work closely with Tall Grass Prairie Preserve and Nature Conservancy of Canada staff to harmonize rare species data and coordinate surveys. The patch edges of on-Preserve occurrences should be precisely recorded using a GPS/hand held PC combination. Updates of on-Preserve occurrences by TGPP staff should be annually incorporated into the CDC's rare species database.

References Cited

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Kartesz, J.T. 1999. A Synonymized Checklist and Atlas with Biological Attributes for the Vascular Flora of the United States, Canada, and Greenland. First Edition. In: Kartesz, J.T., and C.A. Meacham. Synthesis of the North American Flora, Version 1.0. North Carolina Botanical Garden, Chapel Hill, NC.

Appendices

Appendix 1. Conservation Data Centre Ranks

Adapted from the Manitoba CDC website, 1998

Species are evaluated and ranked by the Conservation Data Centre on the basis of their range-wide (global - G) status, nation-wide (national – N) status, and province-wide (subnational - S) status according to a standardised procedure used by all Conservation Data Centres and Natural Heritage Programs. These ranks are used to determine protection and data collection priorities, and are revised as new information becomes available.

For each level of distribution—global, national, and provincial—species are assigned a numeric rank ranging from 1 (very rare) to 5 (demonstrably secure). This reflects the species' relative endangerment and is based primarily on the number of occurrences of that species globally, nationally, or within the province. However, other information, such as date of collection, degree of habitat threat, geographic distribution patterns and population size and trends, is considered when assigning a rank. For example, the Green Frog (*Rana clamitans*) is ranked G5, S2. That is, globally the species is abundant and secure, while in Manitoba it is rare and may be vulnerable to extirpation. For more information on conservation status ranks, please visit:

http://web2.gov.mb.ca/conservation/cdc/.

Appendix 2. BioBlitz Announcement

Roseau River BioBlitz

Staff of the Manitoba Conservation Data Centre and the Nature Conservancy of Canada will be conducting a BioBlitz of portions of the Roseau River in the RM of Stuartburn on May 14 (rain day May 15), and welcome you to join us. A cross-disciplinary team of biologists will work together to rapidly produce an aquatic and riparian species list spanning a number of phyla; a few botanists, malacologists, and ornithologists have already signed up. As the number of participants increase, so will the completeness of the species list.

While logistics have not been finalised yet, one of the goals of this exercise will be to compare biodiversity between channelized portions of the Roseau River with nearby portions that meander naturally. In addition to the promise of a fun-filled day and the opportunity to learn from colleagues about biological groups that you may not be too familiar with, participants will have the satisfaction of knowing that they are helping to produce valuable baseline information for an under-sampled part of Manitoba.

The details:

Roseau River BioBlitz
8:30 AM, May 14 (rain day May 15)
Meet at Tall Grass Prairie Preserve Field House

Following the BioBlitz, there will be pop, hotdogs, hamburgers and a vegetarian option at the Field House. All are welcome to bring a tent and stay at the field house (limited accomodation will also be available inside the house) in order to further explore this corner of Manitoba the next day.

Please express your interest in participating by contacting Cary Hamel (945-7760, chamel@gov.mb.ca) or Bill Watkins (945-8481, wwatkins@gov.mb.ca). Once logistics are finalized, further information will be provided.

Cheers,

Cary and Bill

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Appendix 3. Rare Plant Field Data Collection Form

Manitoba Conservation Data Centre
ELEMENT OCCURRENCE PLANT FIELD FORM

SCIENTIFIC/COMMON NAME: _____

SITE NAME: _____

RM NAME: _____ SURVEYDATE (YY-MM-DD): _____

OBSERVER/SURVEYER : _____

TOWNRANGE AND SECTION: _____

MAPPING NOTES: _____

GPS Point name	Latitude (degree, min, sec)	Longitude (degree, min, sec)

Diagram area noting GPS Points in space above.

Source Feature Label (or GPS Point Name)	Feature ID (from Biotics)	Conceptual Feature: P=Point L=Line A=area (polygon)	Observed Feature:		Locational Uncertainty: Type (N, L, AE, AD)	Distance Class (For Aerial Estimated (AE) uncertainty only)	
			Area	Length		Class	Distance
TOTAL Observed Feature area							

If Areal-Delimited, delimited by what? _____

If Areal-Estimated, ESTIMATED UNCERTAINTY = _____ **meters/feet**

CONFIDENCE EXTENT:
- ☐ Y - Confidence that the full extent of the EO is known
- ☐ N - The full extent of the EO is **not** captured by the EO Representation.
- ☐ ? - Uncertain if the full extent of the EO is known.

REPRESENTATIONAL ACCURACY: ☐ Very high (>95%) ☐ high (>80%-95%) ☐ Medium (>20%-80%) ☐ low (0-20%) ☐ unknown

DIRECTIONS (Driving or hiking directions and/or list prominent topographic features): _____

PLANT DESCRIPTION (area of occupancy, population abundance and density, population fluctuation): _____

PLANT CONDITION (evidence of reproduction, health of population, degree of anthropogenic disturbance, naturalness of hydrology and other ecological processes): _____

LANDSCAPE CONTEXT (degree of fragmentation and connectivity, biological structure, ecological processes, and abiotic factors in the surrounding area): _____

ASSOCIATED TAXA: _____

NUMBER OF INDIVIDUALS COUNTED: _____ ESTIMATED POPULATION SIZE: _____
FLOWER COLOR: _____ REPRODUCTIVE SUCCESS: _____
VEGETATIVE: _____%, FLOWER: _____%, FRUIT: _____%
☐ NATIVE POPULATION ☐ EXOTIC POPULATION ☐ UNKNOWN
EVIDENCE OF DISEASE, PREDATION OR INJURY: _____
EODATA ADDITIONAL COMMENTS: _____

ASPECT: _____ SLOPE: _____ MOISTURE: ____MESIC ____XERIC ____HYDRIC
LIGHT EXPOSURE: ____FULL SUN ____PART SHADE ____FULL SHADE
PARENT MATERIAL: _____ SOIL: _____ LANDFORM: _____
LANDSCAPE COMMENTS : _____

DOMINANT PLANT COMMUNITY: _____
MANAGEMENT/PROTECTION COMMENTS (ex. threats): _____

PREDOMINANT LAND USES: _____
EXOTIC SPECIES if any: _____

OWNER: _____
OWNER COMMENTS: _____

PHOTOS: ☐Y ☐N PHOTO NUMBERS: _____
DATASENS: ☐Y ☐N BOUNDARIES ON AN ATTACHED MAP: ☐Y ☐N
SPECIMENS COLLECTED (if yes list location and numbers): _____

COMMENTS (other): _____